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BIOLOGICAL EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE OCONEE NATIONAL FOREST, Georgia

by

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ABSTRACT

The southern pine beetle outbreak on the Oconee National Forest continues to intensify. Aerial surveys and ground checks of 105,000 acres consisting of 84,000 acres of susceptible host type shows an estimated 218 spots containing 4,244 MBF of infested timber. Forest Insect and Disease Management recommends that the suppression project be continued.

INTRODUCTION

A biological evaluation was made on the Oconee National Forest to determine the status of southern pine beetle infestations and possible need for continuing suppressive measures.

Historically, the Oconee National Forest has experienced four southern pine beetle epidemics in the past 16 years. The first of these (1963) was short-lived, collapsing the following winter (Cambre and Padgett, 1964). In 1968, activity again sharply increased but then again collapsed. Three years later, in 1971, high levels of activity were again reported (Barry et al., 1971), and the epidemic persisted until 1974 (Barber, 1975). This last outbreak began in early 1979, and is believed to be triggered by 2 years of drought-induced stress (Hoffard et al., 1979).

METHODS

In February 1980, the Oconee National Forest flew a 75 percent aerial survey of the forest. Areas of red and fading pine trees were marked on a Class A Forest Service map and categorized by tree number size class (1-10, 11-25, 26-50, 50-100, and 100+). Ten percent of these spots were randomly selected for ground checking by the Asheville Field Office. At each spot, infested trees were tallied to determine correction factors so as to project total numbers of infested trees throughout the forest. Additionally, infested tree volumes were taken to project total volumes of infested timber forest-wide.

RESULTS

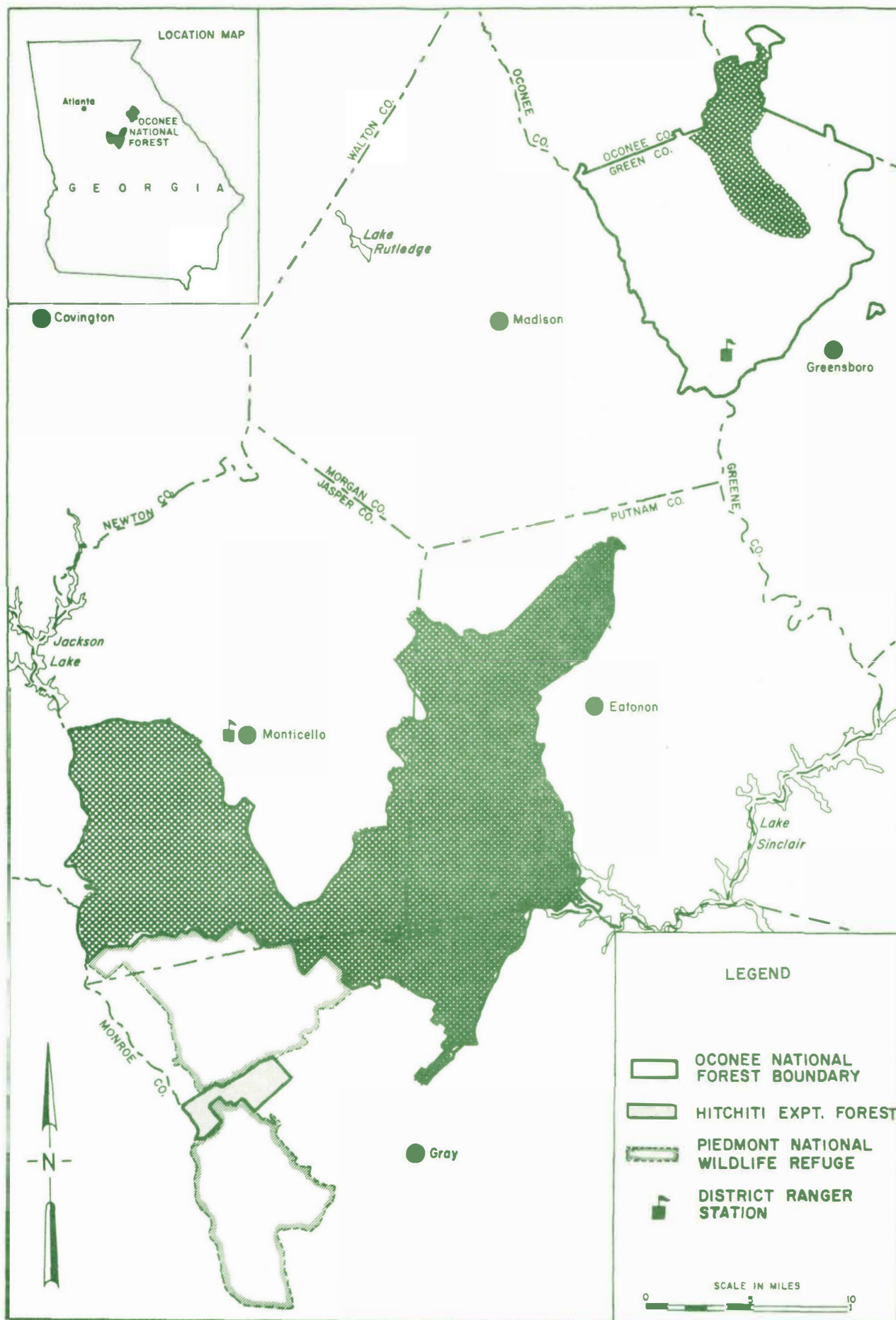
Table 1 shows results of the aerial and ground surveys with spots classified by number of trees per spot.

Based on use of correction factors and volume projection gained during the ground phase of the survey, an estimated 28,853 trees are currently infested. Virtually all of the Uncle Remus District and much of the Redlands District are covered by the outbreak (figure 1). These trees represent an estimated 4,244 MBF of infested timber. Based on a factor obtained through a review of Oconee spot growth characteristics, this represents a very serious potential loss if spots are permitted to grow. Our best estimate is that 21,850 MBF would be killed by the end of the fiscal year.

Table 1.--Corrected aerial and ground survey data showing number of southern pine beetle spots, number of trees, and volume of timber currently infested by size class--Oconee National Forest, 1980.

	----- Spot Size Category -----					
	<u>1-10</u>	<u>11-25</u>	<u>26-50</u>	<u>50-100</u>	<u>100+</u>	<u>Total</u>
Number of spots	0	8	47	68	95	218
Number of trees	0	163	1,712	4,641	22,337	28,853
Volume (MBF)	0	25.5	250.4	683.3	328.51	4244.3

Figure 1.--Areas of heaviest southern pine beetle activity on the Oconee National Forest.



DISCUSSION AND RECOMMENDATIONS

The data indicate that the southern pine beetle outbreak reported in 1979 continues at high levels throughout most of the Oconee National Forest. Suppressive measures initiated in 1979 should continue.

CURRENT SUPPRESSION PROCEDURES

1. Removal of Infested Trees by Commercial Sale or Administrative Use. When infested trees of merchantable size are accessible, they should be removed by commercial sale or administrative use procedures. Logging of the infested material should begin immediately. Contract time limits should insure rapid removal.

When practical, and if host type is present, a 40- to 70-foot buffer strip should be marked and cut adjacent to and ahead of the most recently infested trees. This practice is effective in reducing the possibility of "breakouts." When only a small volume of infested merchantable material occurs in a spot, noninfested trees surrounding the spot may be marked to provide an operable cut.

The order of priority of removing beetle-infested timber from a spot should be as follows:

- Trees in the buffer zone at the head(s) of the spot - if not removed within 2 weeks of marking, another visit and tally must be made in order to insure removal of all infested trees and an adequate buffer strip.
- Trees with fresh attacks and having young broods (usually the green, recently infested trees).
- Trees having nearly developed broods (usually the red and fading trees).

Remove infested trees from National Forest lands by commercial sale or administrative procedures in accordance with guidelines and procedures set forth in FSM 2400 through 2490.

2. Piling and Burning. Unmerchantable or inaccessible southern pine beetle infestations can be suppressed by cutting, piling, and thoroughly burning the bark of infested trees. The entire bark surface must be thoroughly burned to insure effective control. The side order of priority

for cutting, piling, and burning infested trees, particularly the large spots, is the same as paragraph (1) under "Removal of Infested Trees by Commercial Sale or Administrative Use." Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts," every effort should be made to locate and treat all green infested trees during the piling and burning operation.

3. Chemical Control. Chemical formulations recommended for southern pine beetle control is a $\frac{1}{2}$ percent lindane spray with water as the carrier. This may be formulated from a 20 percent lindane emulsifiable concentrate at the rate of 11 pints of concentrate in enough water to make 55 gallons of spray. (Ratio of one part 20 percent lindane EC to 39 parts water.)

Dursban® (chlorpyrifos) is also registered for southern pine beetle control. It is available as a liquid containing 4 pounds of insecticide per gallon of concentrate. The spray is prepared by mixing 2 $\frac{2}{3}$ fluid ounces of concentrate with water to make 1 gallon or 2.1 gallons of concentrate in 100 gallons of water. Dursban® is to be applied only by or under the supervision of a certified pest control operator or other trained personnel responsible for insect control programs.

Cut, limb, and buck all infested trees into workable lengths. Spray the infested bark surface to the point of runoff. A compressed air sprayer (3-gallon capacity or equivalent) is an ideal applicator. Infested logs must be turned two or three times to insure complete treatment of infested bark. Spray stumps and bark removed by woodpeckers. Low pressure sprayers may be used to treat large accessible infestations.

The order of priority for cutting and spraying infested trees in large spots is the same as paragraph (1) under "Removal of Infested Trees by Commercial Sale or Administrative Use." Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts," every effort should be made to locate and treat all green infested trees during the chemical control operation.

Never spray trees from which southern pine beetle brood has emerged. Natural enemies of the southern pine beetle in these trees can then complete their development. To prevent aerial spotters from mapping treated spots, cut trees with red needles from which beetles have emerged.

Instructions for minimizing the adverse effects of mixing, transporting and storing pesticides, applying pesticides and disposing of pesticide containers and excess chemicals are outlined in Section 8.3 of the Forest Service Health and Safety Code FSM 5242.21.

4. Cut-and-leave. This control tactic reduced losses from spot growth and proliferation during the summer months. Cut-and-leave is designed to disrupt spot growth in small to medium-sized spots (40 active trees) by dispersing emerging beetles. These spots can be salvaged when markets or weather permit. Trees are still suitable for sale months after felling.

The following procedure is to be followed when using cut-and-leave:

- (1) Identify all active trees within the spot.
- (2) Fell all active trees toward the center of the spot.
- (3) Fell a horseshoe-shaped buffer of green, uninfested trees around the most recently attacked trees at the head of the spot and leave them lying on the ground with crowns pointed toward the center of the spot. The buffer should be as wide as the average height of the trees in the stand.

Cut-and-leave treatments should only be applied during the summer months between June and October. Spots with 10 or more infested trees should be treated first. As time permits, spots with 10 infested trees should also be treated if they contain trees with fresh attacks. In these smaller infestations where a specific head is not distinguishable, an adequate buffer strip (equivalent to the average height of the stand) and all infested and green uninfested trees within the spot should be felled.

Reexamination of Treated Areas. Reexamine areas where infested trees were removed by commercial sales, piled and burned, or chemically treated or cut and left within 2 or 3 weeks after treatment to check for additional infested trees. If additional trees are found, treat them.

In any area where infested trees are cut for chemical control or piling and burning or removed through commercial sales and administrative use procedures, stumps adjacent to living pine trees should be treated to control or prevent the root rot Fomes annosus.

Stands that have been previously thinned or have had a history of F. annosus infection, stumps should be treated with the competing fungus, Peniophora gigantea.

Stands that have no history of F. annosus and have never been thinned, the stumps should be treated with borax.

Southern pine beetle infested tree stumps cut during the period of May through August, and below 34° N. latitude do not have to be treated with either of the above materials. This is because few spores are formed during this period and high temperatures often kill spores that are produced. However, routine summer thinning in areas of southern pine beetle buildup is not recommended.

PREVENTIVE MEASURES

The preceeding represents only short-term, immediate control strategies. Preventive measures must be taken to help ward off further southern pine beetle infestations in noninfested stands. Some of the more significant preventive measures include:

1. Preventing or minimizing littleleaf disease, a condition which predisposes these weakened trees to beetle attack. Depending on severity of infection, diseased trees may be removed during normal thinnings, on a 6-year cutting cycle or as soon as merchantable. In high-hazard areas or in replanting known littleleaf sites, use loblolly pine or a more resistant tree species, as opposed to shortleaf pine.
2. Harvesting mature and overmature stands. Such stands are vulnerable to beetle attack and should be harvested as soon as possible.
3. Thinning stagnated stands. Overstocked stands are low in vigor and are more likely to be attacked. They should be thinned to a point that trees again show thrift and vigor.
4. Minimizing impact of natural disturbances which causes stand stress. These factors include ice, wind, hail, and animal damage, flooding, erosion, poor soil fertility, etc. Corrective measures include removal of individually damaged trees, wholesale salvage, improving drainage, fertilization, etc.
5. Minimizing or eliminating man-caused disturbances. Logging, pipeline, sewerline, and powerline construction, and other construction activities require use of heavy equipment which causes tree skinning and soil compaction and significantly weakens trees. Efforts to minimize the damaging consequences of these activities can significantly reduce the possibility of their leading to southern pine beetle problems.

PRECAUTIONARY PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key--out of reach of children and animals--away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you used for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary landfill dump, or crush and bury them in a level, isolated place.

NOTE: Some states have restrictions on the use of certain pesticides. Check your state and local regulations. Also, because registration of pesticides are under constant review by the U. S. Department of Agriculture, consult your county agricultural agent or state extension specialist to be sure the intended use is still registered.

REFERENCES

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